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ABSTRACT

Because a lack of adequate data eliminated the possibility of using control groups or historical comparison groups, Colorado's procedure for evaluating state bilingual/bicultural programs was designed to determine whether children in the bilingual program (K-3) had learned more than they would have learned if they had not been in the program. A norm referenced standardized achievement test was used for this. Program participants were predominantly Mexican American. Projects reported pre and post test results (on achievement, attendance, self-concept and parental involvement) in Normal Curve Equivalents for Linguistically Different (LD) and Non-Linguistically Different (NLD) children. A gain of one-third of the standard deviation with respect to the national norm was chosen as the criterion for judging when significant gain or loss had occurred. Major problems were in the availability of data, caused by an unavoidable dependence on the regular testing schedules of school districts (testing every third grade level) and their willingness to administer additional tests. Data indicated that: the program was successful at every grade level; results were more positive in each succeeding year of the program; and NLD children, as well as LD children, benefited from the bilingual programs. (CM)

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BILINGUAL BICULTURAL EDUCATION

THE COLORADO SUCCESS STORY

By

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and

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Littleton, Colorado

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INTRODUCTION

Evaluation of bilingual bicultural programs is a controversial area. Starting with the AIR study and Noel Epstein's book, Language, Ethnicity and The Schools, the evaluation controversy went public. The publication of The Proposed Lau Rules in the August 5, 1980 Federal Register has occasioned much public comment. The National School Boards Association sent a news release in which they announced a News Conference on September 9, 1980 in Denver. Among other things it said "Dr. Eugene Glass, nationally known authority on education of students with limited proficiency in English, will discuss his research which shows there is no educational merit in the Department of Education's position that 'transitional bilingual' education is the only, or best method for teaching students with limited English proficiency."

The general reader would probably emerge from the public debate with the impression that bilingual education has not proven itself in terms of evaluation. That conclusion at least as regards to Colorado is false and we suspect untrue even on a national level. However, the major problem is lack of availability of reports, evaluations, etc. Evaluations do exist but are not often readily available or widely known. Secondly, evaluations are usually written to satisfy federal, state or local requirements. They do not often tend to be written to fill a researcher's dream of what she/he would like to have as the basis of a study.

The remaining part of this paper attempts to analyze how one state developed an evaluation process on a local and statewide basis. Having systematized the reporting of data, the use of the data then became a useful tool for evaluating programs on a statewide basis. The results are outstanding.

Focusing on Colorado as an example rather than a model may prove illustrative. While Colorado has a significant language minority in schools - 15% - most of whom are Hispanics - it is a relatively small state with a half million total students. At the same time it is one of the southwestern states which is traditionally thought of as the logical place for bilingual bicultural programs. Because of the above, Colorado is an "average" state not among the giants like New York, California or Texas but at the same time a state that has a considerable need for bilingual bicultural services.

BACKGROUND

During the 1974-75 school year the Colorado state legislature passed a Bilingual Act which mandated a full time bilingual bicultural program for grades K-3 for schools who had 10% or 50 children who were "linguistically different". "Linguistically different" was originally defined as a student who came from a background of a language or culture other than English and who was performing below the district mean academically. During the 1976-77 school year the definition was changed to "language and culture other than English and below the district mean."

School districts planned to evaluate the program at the end of each academic year. The first possible year was 1975-76. The results were spotty, mostly because pre and post testing data was not available. In 1977 the SEA-CDE began to develop a systematized evaluation process which required that all districts submit the same type of data covering achievement, attendance, self-concept and parental involvement. The first year under this system was the 1977-78 school year. Because the evaluation system was

not finalized until February 1978 some districts had not collected all the data. The system was further refined and the districts have supplied more data for the 1978-79 and 1979-80 school years. Dr. Ross Goldsmith did the last three evaluations starting in 1977-78 school year. He was instrumental in assisting the Bilingual Unit in fine tuning the original evaluation instrument which was designed by Dr. Michael Massarotti.

One of the major problems remaining is that of pre-posting testing at every grade level in every district. The normal testing pattern in Colorado school districts is to test every third grade level usually starting at 2nd or 3rd grade. Districts are reluctant to test more frequently especially since they usually have to assume the costs of testing.

The most pervasive problem, however, is an artifact of The Act itself; the legislative prohibition on a state mandated testing program. Since the CDE cannot mandate that test data be gathered, evaluations depend upon the regular testing schedules of the districts and their willingness to voluntarily engage in testing beyond that which they would otherwise do. This is the primary reason that many projects report data for only one or two grade levels. As long as this legislative ban on statewide testing remains a part of The Act, complete comprehensive evaluation of the state programs will remain an unattainable goal.

The following graph illustrates how the number of districts reporting useable data has increased each year. It should be noted that one district's failure to report data for '79-80 was due to a teacher's strike. Another district changed tests and hence a pre-post comparison was impossible.

	No Data	1 Grade	2 Grades	3 Grades	4 Grades
1977-78	22	7	6	7	4
1978-79	10	7	10	12	3
1979-80	3	2	10	17	9

DESIGN

The intent of this section is to summarize the data provided in the evaluation reports submitted to the Colorado Department of Education by the individual bilingual programs and to determine the extent to which the programs have been successful in meeting the objectives as specified in The Act. It is not concerned with project costs or with any benefits which project participants may have accrued other than those corresponding to the four objectives of The Act. Neither does this section address such "process" variables as how well the individual projects met their own objectives, how well the needs of the children were assessed, or how closely the projects appeared to have followed prescribed instructional strategies. The focus of this effort has been to obtain as clear and unambiguous an answer as possible to the impact question, "How much more did pupils learn (develop positive self concepts, attend school) by participating in the project than they would have without it?"

In order to meaningfully determine whether children in the program learned more than they would have had they not been in the bilingual programs, some estimate of the learning rate they would be expected to evidence in the absence of any special program must be generated. Neither control groups nor historical comparison groups could be used since data was not available. The alternative is to generate some reasonable expectation of what the learning rate would be in the absence of a bilingual educational program. The most straightforward procedure involves the use of norms accompanying standardized achievement tests. A norm referenced model was adopted.

Since the application of this model requires that pre and post test scores be available, we reviewed all evaluation reports and identified those projects for which a pre and post test score was reported for Linguistically

Different students in at least one grade. In 1978-79 thirty-three projects reported usable pre and post test data at at least one grade level for Linguistically Different students. In 1977-78, only twenty-four projects reported such data. Thus 1978-79 represents a 27% improvement in evaluation reporting, and data collection. In 1979-80, thirty eight districts (93% of the total districts) reported useable data for at least one grade level.

In order to express project impact in a common metric, so the findings of one project could be aggregated with those of other projects, projects reported their pre and post test results in Normal Curve Equivalents (NCEs).

NCEs generate scores that comprise equal interval scales. NCEs have a mean of 50 and standard deviation of 21.06. Standard scores have the advantage of being equal interval scales as well as being related to the percentile rank of the distribution of scores. At such it is possible to treat them mathematically as well as make meaningful interpretations of the scores themselves in terms of their relationship to the norm. Neither grade equivalents nor percentiles are equal interval scales, therefore they cannot be meaningfully added, subtracted, or multiplied together. Likewise, it is not possible to equate a gain of 5 percentile points from the 50th to the 55th percentile. Not only do grade equivalent scores have the same disadvantage as percentile scores (they are not equal interval scales) they have a number of other, in some ways more serious, technical weaknesses as well. Fiscal constraints prevented most projects from making a t-test for correlated means.

It was necessary to establish a criterion for judging when a significant gain (or loss) had occurred. A gain of one third of the standard deviation with respect to the national norm was chosen as the criterion to be used in making this judgment. Since the standard deviation of NCEs is, be definition, 21.06, a significant gain (or loss) was judged to have occurred if the post-

test score was seven or more NCEs above or below the pre-test score for any grade level group of students. This criterion has been recommended as a criterion for judging educational (as opposed to statistical) significance of educational programs (Horst, Tallmadge, and Wood, 1976). It has been used in a number of federally funded studies of educational program impact. It is also used as a criterion for identifying exemplary, not just successful, programs for packaging and dissemination by the Joint Dissemination Review Panel of the Education Division of the Department of Health, Education, and Welfare.

This criterion is a very stringent requirement of an educational program; it defines exemplary programs, not just successful ones.

Using this model, if the Linguistically Different students in the Kindergarten of a bilingual program evidenced a gain of seven of more NCEs; the students did better in the project than we estimated that they would have done without the project. We would judge that such a project had certainly been successful in meeting the objective of The Act for the Linguistically Different students in Kindergarten. In fact, this gain is evidence of substantial success. What may be somewhat less clear is that if the Linguistically Different students in such a program might be judged to be successful in preventing a deterioration of the expected learning rate of the students. There is a large body of literature that suggests that Mexican-American students (and most Linguistically Different students in Colorado Bilingual Programs are Mexican-Americans) do not maintain the same post-test status with regard pre-test status through the public school process. Rather, this group of children seems to lose standing with respect to national norm groups. Hansen (1979) reported that in one large school district in Colorado, a sample of Spanish surnamed students went from the 47th percentile in Reading in grade three to the 34th percentile by grade six. These students were at the 47th percentile in Math in third grade but fell to the 30th

percentile by sixth grade. A drop from 47th to 30th percentile in Language from third grade from third to sixth grade was reported. Hansen also notes that of 13 school districts with over 50% Hispanic enrollment, 8% reported that average third grade reading achievement was below the 50th percentile nationally, 38% reported sixth grade students' average reading achievement was below the national average. Similar trends have been documented in many other communities (for example Coleman, 1966).

Technically, the hypothesis and investigations we are testing with the gain of seven NCE procedure noted above is that, in the absence of a bilingual educational program, the students will stay at the same level on post-test that they evidenced on pre-test. The discussion above highlights the fact that this hypothesis may not actually represent the true educational expectation for these children. There is at least some reason to believe that a more reasonable expectation of Linguistically Different students is that they will fall progressively further and further behind, rather than holding their own. In light of this analysis, a program that prevents such students from falling further and further behind as they progress through the grades would have to be judged successful, at least in part. Therefore, we would argue that programs in which Linguistically Different students evidenced neither a significant gain nor a significant loss are, at least in part, successful. Educators would do well to join with physicians in vowing that they will "in the first instance, do no harm".

Table I displays the number of projects for each grade level in which the Linguistically Different children and the Non-Linguistically Different children showed either a gain or a loss or no change in their pre/post-test status in 1977-78, 78-79, and 79-80.

TABLE I

1977-78

Student Classification	Kindergarten		
	Lost 7 or more NCEs	No Change	Gained 7 or more NCEs
L.D. N=13	1	5	7
NLD N=12	1	3	8

Student Classification	1st Grade		
	Lost 7 or more NCEs	No Change	Gained 7 or more NCEs
L.D. N=14	3	3	5
NLD N=14	1	5	5

Student Classification	2nd Grade		
	Lost 7 or more NCEs	No Change	Gained 7 or more NCEs
L.D. N=18	1	13	4
NLD N=16	1	10	5

1978-79

Student Classification	Kindergarten		
	Lost 7 or more NCEs	No Change	Gained 7 or more NCEs
L.D. N=17	0	2	15
NLD N=16	0	3	13

Student Classification	1st Grade		
	Lost 7 or more NCEs	No Change	Gained 7 or more NCEs
L.D. N=17	2	5	11
NLD N=16	1	9	6

Student Classification	2nd Grade		
	Lost 7 or more NCEs	No Change	Gained 7 or more NCEs
L.D. N=23	1	14	8
NLD N=22	1	14	7

1979-80

Student Classification	Kindergarten		
	Lost 7 or more NCEs	No Change	Gained 7 or more NCEs
L.D. N=12	0	3	9
NLD N=12	0	3	9

Student Classification	1st Grade		
	Lost 7 or more NCEs	No Change	Gained 7 or more NCEs
L.D. N=24	1	10	13
NLD N=21	1	11	9

Student Classification	2nd Grade		
	Lost 7 or more NCEs	No Change	Gained 7 or more NCEs
L.D. N=33	3	21	9
NLD N=28	5	16	7

TABLE I (Con't.)

1977-78				1978-79				1979-80			
Student Classification	3rd Grade			Student Classification	3rd Grade			Student Classification	3rd Grade		
	Lost 7 or more NCEs	No Change	Gained 7 or more NCEs		Lost 7 or more NCEs	No Change	Gained 7 or more NCEs		Lost 7 or more NCEs	No Change	Gained 7 or more NCEs
L.D. N=14	1	9	4	L.D. N=18	2	12	4	L.D. N=31	2	25	4
NLD N=12	0	9	3	NLD N=18	1	15	2	NLD N=28	0	22	6

N= number of projects reporting usable pre/post-test data for specified grade level group of students

L.D. = Linguistically Different students

NLD = Non-Linguistically Different students

The graph clearly illustrates the overwhelming success of the program. Each year the amount of usable data has increased significantly. For 1979-80 thirty-eight out of forty-one had achievement data at least at one grade level. This represents 93% of the districts with programs. The graph clearly indicates that at every grade level the program has been a success. At kindergarten all reporting programs either maintained or significantly increased achievement for both LDS and non-LDS. At first grade for LDS 23 out of 24 maintained or significantly increased achievement and for NLDS 20 out of 21. At second grade for LDS 30 out of 33 maintained or showed significant achievement. Twenty-three out of 28 showed the same for NLDS. For 3rd grade LDS 29 of 31 and all NLDS groups maintained or showed significant increase.

The graph also clearly demonstrates that the results have been more positive in each succeeding year of the program.

As a further refinement of the achievement data for 1979-80 the figures were broken down further using +3 NCES as the measure of significant gain. This is the same criterion used by Title I as the measure of success.

For LDS and NLDS the following graph illustrates the achievement growth using +3 NCES for 1979-80.

TABLE II

Grade	Number Reporting		More Than -3 NCES		+ -3 NCES		More than + 3 NCES		Percent maintaining or gaining	
	LD	NLD	LD	NLD	LD	NLD	LD	NLD		
K	12	12	0	0	2	0	10	12	100%	100%
1	24	21	1	1	2	8	21	12	96%	95%
2	33	28	7	7	9	5	17	16	79%	75%
3	31	28	5	2	10	9	16	17	84%	93%
Total K-3	100	89	13	10	23	22	64	57	87%	89%

The data strongly indicates the success of the bilingual programs in Colorado. Interestingly the data emphatically supports the conclusion that Colorado bilingual programs are eminently successful for both the LD & NLD student. Bilingual education as an educational process benefits both "types" of participating students in Colorado.

While the Colorado results are only applicable to the Colorado scene within the limits described in this article, the authors suspect that other programs in other states may show similar results. The main purpose of the authors in this article has been to clearly show the results of the evaluation data of one state's bilingual program. The results in Colorado provide a clear and emphatic response to the persistent question about the effectiveness of bilingual education. For Colorado at least the answer is a resounding "yes".

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